

North Atlantic Treaty Organization  
Research and Technology Agency  
HFM-180/RTC Technical Course  
Strategies to Address Recruiting and Retention Issues in the Military

## COMPENSATION: PAY AND BENEFITS U.S. NAVY RESEARCH INITIATIVES AND APPLICATIONS

Tanja F. Blackstone, Ph.D.  
Navy Personnel Research, Studies, & Technology  
October 2009

## Report Documentation Page

*Form Approved*  
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>OCT 2009</b>	2. REPORT TYPE <b>N/A</b>	3. DATES COVERED <b>-</b>			
4. TITLE AND SUBTITLE <b>Compensation: Pay and Benefits U.S. Navy Reserch initiatives and Applications</b>					
5a. CONTRACT NUMBER					
5b. GRANT NUMBER					
5c. PROGRAM ELEMENT NUMBER					
6. AUTHOR(S)					
5d. PROJECT NUMBER					
5e. TASK NUMBER					
5f. WORK UNIT NUMBER					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>North Atlantic Treaty Organization Research and Technology Agency</b>					
8. PERFORMING ORGANIZATION REPORT NUMBER					
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)					
10. SPONSOR/MONITOR'S ACRONYM(S)					
11. SPONSOR/MONITOR'S REPORT NUMBER(S)					
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release, distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>See also ADA562470. RTO-EN-HFM-180 Strategies to Address Recruiting and Retention Issues in the Military (Strategies pour aborder les questions de recrutement et de fidelisation dans les armees), The original document contains color images.</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:  a. REPORT <b>unclassified</b>			17. LIMITATION OF ABSTRACT <b>SAR</b>	18. NUMBER OF PAGES <b>20</b>	19a. NAME OF RESPONSIBLE PERSON
b. ABSTRACT <b>unclassified</b>		c. THIS PAGE <b>unclassified</b>			

# RTO-TR-HFM-107 Recruiting and Retention of Military Personnel



- Compensation Chapter focused on:
  - Overview of current compensation.
  - Modeling and estimation of selective reenlistment bonuses (SRB), auctions, choice theory as they pertain to offering flexible compensation plans.
  - Provide brief overview and update.
- Additions to this discussion include:
  - Indirect incentives – promotions
  - The use of economics based experiments in setting compensation.
    - » Risk Preference
    - » Time Value of Money
      - SRB
      - 401K Plans (retirement)
      - Enlistment Bonuses
      - GI Bill

# Retention and SRB Payouts

## Average SRB Awarded by Paygrade

Dim Fiscal Year

Fiscal Year	2000	2001	2002	2003
E-2	—	—	—	\$1,858.88
E-3	\$16,433.75	\$17,729.22	\$16,481.23	\$12,344.91
E-4	\$24,965.71	\$25,130.32	\$23,898.44	\$19,322.76
E-5	\$29,839.60	\$27,780.06	\$26,370.97	\$21,699.58
E-6	\$26,930.01	\$28,827.33	\$29,430.72	\$30,091.91
E-7	\$16,062.12	\$19,564.49	\$23,001.23	\$24,729.64
E-8	\$18,284.16	\$22,380.24	\$22,027.16	\$23,134.63

- SRB is in addition to base pay, average FY02 base pay for enlisted \$43K, not including SRB or other special pays.
- For the sample period, 1995-2004, SRB multiplier ranged from 0-8. By 2008 SRB multiplier exceeds 10 for certain skill groups.

# Retention and SRB Payouts (con't)



Table 3H-3: Weapons Control – SRB Experiments for GME 3  
Categories Model (Full Sample 66,509 Observations)

	Base Case	SRB+0.5	SRB+1	SRB+1.5	SRB+2	SRB+2.5	SRB+3
<b>Implied Elasticities (0)</b>		0.45	0.40	0.36	0.33	0.30	0.28
<b>Prob Leave</b>	0.4615	0.4008	0.3554	0.3224	0.2982	0.2802	0.2664
<b>Prob Extend</b>	0.2032	0.2118	0.2135	0.2115	0.2075	0.2025	0.1971
<b>Prob Re-enlist (infinity)</b>		0.3580	0.3842	0.4078	0.4289	0.4478	0.4647
<b>Prob Re-enlist (0)</b>	0.3353	0.3875	0.4311	0.4661	0.4943	0.5173	0.5364
<b>% Change Re-enlist (infinity)</b>		6.8%	14.6%	21.6%	27.9%	33.6%	38.6%
<b>% Change Re-enlist (0)</b>		15.6%	28.6%	39.0%	47.4%	54.3%	60.0%
<b>Mean \$SRB</b>	1,244	1,677	2,129	2,582	3,034	3,486	3,938
<b>Normalized % Change Re-enlist (infinity)</b>		6.3%	12.2%	17.7%	22.7%	27.3%	31.5%
<b>Additional Re-enlisted Personnel</b>		3,458	7,715	11,506	14,964	18,090	20,817
<b>Normalized % Change Re-enlist (0)</b>		12.3%	23.0%	31.7%	38.8%	44.7%	49.5%



# Unemployment

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- Unemployment – indirect measure of probability of being employed in outside sector.
  - Used as primary indicator of retention and enlistment behaviors, forecasting end-strength and setting specific compensation.
    - » Selective Reenlistment Bonuses (SRB)
    - » Enlistment Bonuses
    - » Assignment Incentive Pay



# Unemployment Primer



- Survey of 60K households conducted monthly, Bureau of Labor Statistics, [www.bls.gov](http://www.bls.gov).
- Unemployment rate is the percentage unemployed divided the labor force.
  - Labor Force is the sum of the number of people employed and unemployed.
  - To be considered unemployed individual must be in a temporary layoff status or be actively seeking employment within the last 4 weeks.
- Unemployment is a lag indicator
  - Unemployment may continue to increase or remain stagnate up to 2-3 quarters after the economy has shown positive economic growth.
    - » Caution needed in using unemployment to forecast retention, accessions, and end-strength.



# Types of Unemployment Statistics

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- Types: industry, national, occupation, regional, and characteristics.
  - Best choice as explanatory variable for retention and end-strength forecasts is likely to be dependent on model specification.
    - » 28 DoD Occupation Skill Groups Retention Model.
      - National unemployment more robust predictor relative to educational unemployment.



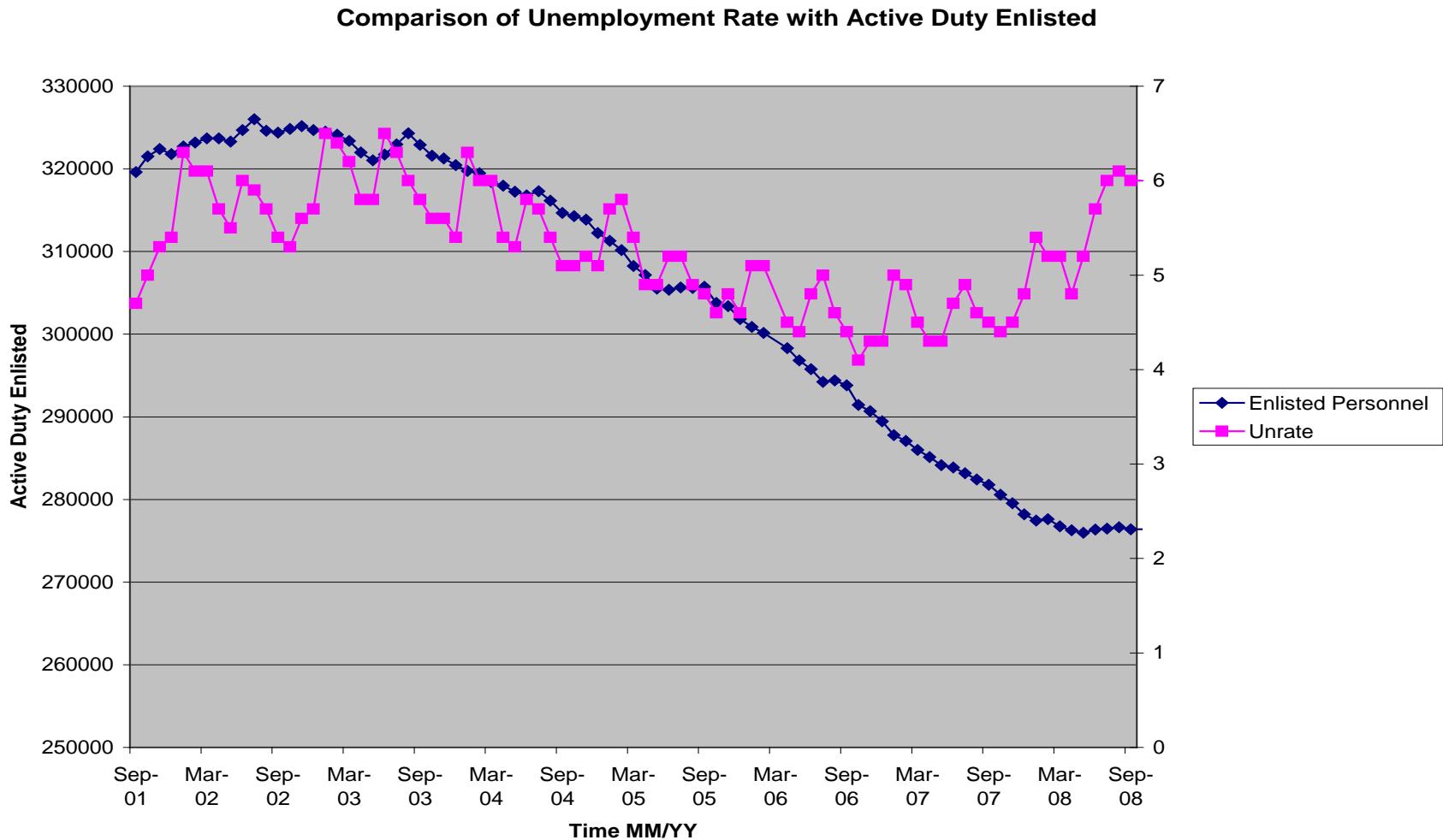
# Comparison of Unemployment Rates



## Comparison of Occupational and National Unemployment Bureau of Labor Statistics

Occupation	2007 Occupation Unemployment Rate	2007 National Unemployment Rate	2007 Percentage Difference between National and Occupation Unemployment Rate	2008 Occupation Unemployment Rate	2008 National Unemployment Rate	2008 Percentage Difference between National and Occupation Unemployment Rate
Management	2.1	4.6	54.34	2.7	5.8	53.44
Service	5.9	4.6	-28.26	6.7	5.8	-15.51
Sales and Office	4.3	4.6	6.52	5.3	5.8	8.62
Production and Transportation	5.8	4.6	-26.08	7.6	5.8	-31.03

# Comparison of Unemployment and Active Duty Enlisted



# Retention Effects and Unemployment

## Weapon Control – Unemployment Analysis

Sensitivity of individuals to changes in unemployment analyzed using three categories, 0\* = leave 1\*\* = extend, 2\*\*\* = stay

Evaluated at			1995-1996	1997-1999	2000-2002
Mean over individuals	Unemp.	GME - 3 categories	-.31**,.357***	-	-.3*,.01**,.28***
	Unemp Education	GME - 3 categories	-.45*, 1.51**, -15***	-.14*,.69**,-.28***	-.28*,.05**,.25***
Mean AFQT			72.4	74.7	76

- Sensitivity of enlisted personnel to unemployment declines over time.
- Results consistent over 2001-2008 sample period, for 28 DoD occupational skill Groups.
- Results could be driven by higher AFQT's over sample period, and significant increases in base pay and SRB.

# Career Case Manager Technologies

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N P R S T



# Career Case Manager Technologies Objectives



CCMT arose to support the Sea Warrior concept of self-detailing and Sailors taking responsibility for career management.

CCMT provides Sailors with empirical information about promotion potential to support the self-management of their career.

Helps Sailors determine the best job for:

1. Quickest advancement
2. Change factors that impact advancement speed
  - Sea Duty
  - Exam Score
  - Duty Locations – CA, duty/unit type
  - Final Multiple Factors
  - Education
3. Geographic Stability



# NETPDTC Advancements – How They Work

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- Final Multiple Components
  - Exam Score
  - PMA – based on 1-4 scale
  - PNA – points awarded if individual passed exam but was not advanced
    - » PNA points vary by PG
    - » Higher exam score greater number of PNA pts awarded
    - » PNA points can be lost if individual fails next exam
  - Minimum TIR
  - Awards – not included in CCMT FM – makes up < 4% of FM
  - E-7 advancements only consider PMA, Exam, and board recommendation
  - Components of FM weighted by PG and TIPG
    - » Greater weight placed on exam score for lower PGs w/greater weight on performance for E-6 and above – See BUPERSINST 1430 and 1610



# Advancements – How They Work (con't)

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- Eligible for advancement – must meet min TIPG
  - Varies by PG
- Exam score (standard score 20-80)
  - Performance Mark Average  $\geq 3.6$ , in order to take the exam
  - E-4 to E-6 can take exam 2x/year
  - E-7 can take exam 1x/year
- Inverse relationship between vacancies and cut score
  - Cut Score – minimum exam score needed to be considered for advancement
    - » Cut score is adjusted in every advancement cycle



# Forecasting Promotion Probabilities: Three Approaches

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- Mean forecasting
  - Matrix multiplication of the mean estimated promotion-probability matrix
    - » (Average E3 characteristics)\*(global matrix)
      - Global matrix is mean across paygrades
- Individual forecast based on Sailor specific characteristics/row
  - (Individual characteristics at starting point of forecast)\*(global matrix)
    - Global matrix is mean across paygrades
- Cohort Effect
  - (Individual characteristics at starting point of forecast)\*(global matrix)
    - » Global matrix – is mean for each paygrade



# ADMIN with Transfers

- Transfers are defined within or out of skill group

Predicted Transition Probabilities

	E-3	E-4	E-5	E-6	E-7	LOSS
E-3	21.6	63.2	0.0	0.0	0.0	15.3
E-4	0.0	46.3	32.4	0.0	0.0	21.3
E-5	0.0	0.0	53.5	33.4	0.0	13.1
E-6	0.0	0.0	0.0	43.8	26.7	29.5

RHS average effect on event data.  
Only tells you "within 1 year of sitting for exam or eligible to promote"

Within 1 year, 21.6% probability E-3 not advanced

Within 1 year, 63.2% probability of E-3 advanced to E-4

Within 1 year, 15.3% probability of E-3 will be lost

Within 1 year, 33.4% probability of E-5 advanced to E-6



# ADMIN with Transfers



Predicted Transition Probabilities T=3

	E-3	E-4	E-5	E-6	E-7	LOSS
E-3	.0100	22.78	24.80	6.83	0.00	44.58
E-4	0.00	9.93	24.20	15.51	2.89	47.47
E-5	0.00	0.00	15.29	23.77	17.59	43.35
E-6	0.00	0.00	0.00	8.40	43.52	48.08
E-7	0.00	0.00	0.00	0.00	1.0	0.00
LO	0.00	0.00	0.00	0.00	0.00	1.00

If E-3 in time "t" in "t+3," 24.8% probability of being advanced to E-5

If E-4 in time "t," 3 years from now 15.51% of being advanced to E-6

Predicted Transition Probabilities go to T=7



# Marginal Effects

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- Marginal effects:
  - By PG/Skill results show significant effects for:
    - » Sea duty
    - » Sea Months
    - » Concentration Area (CA)
    - » CA changes prior to and after advancement
    - » Number of times taken exam
    - » PMA
    - » Education



# Marginal Effects - ADMIN



Variable	E-3 to E-4	E-4 to E-5	E-5 to E-6	E-6 to E-7	Loss
Sea Duty				12.77	
FC Norfolk		-5.17		12.65	
H.S +		9.9	7.7		
AFQT	-	-	-	-	
PMA		10.7			
Sea Months					< 1

N P R S T



# Surface Combat Weapon – Individual Sailor



High School +

AFQT = 87

MOS = 25

TIR = 8 months

PMA = 3.6

Sea Months = 1

CA= Corpus

Christi

Cycle Cut = 179.75

Final Multiple = 124.89

DNEC 0981 = 1

Vertical Launching  
Systems Maintenance

Start E-4 5 Year Forecast

	E-4	E-5	E-6	E-7	Loss
Year 1	1				
Year 2	36.35	25.78			37.86
Year 3	13.21	28.01	4.87		53.9
Year 4	4.8	23.65	9.46	.05	62.03
Year 5	1.75	18.33	12.57	.14	67.21

N P R S T

